very effective for weight reduction of a display device, there remain problems to be solved in order to ensure the reliability of the organic light emitting element.

## SUMMARY OF THE INVENTION

The present invention relates to a technique for solving such problems and an object of the present invention is to provide a display device using an organic light emitting element having high reliability and a manufacturing method thereof.

As the substrate made of glass has become thinner, when the element substrate made of glass and the sealing substrate made of metal are bonded together. because of a difference in a thermal expansion coefficient, the possibility that the element substrate made of glass is broken due to a sudden change in a temperature becomes high. In order to prevent this, according to the present invention, a substrate made of glass is used for the element substrate and the sealing substrate to obtain an identical thermal expansion coefficient. Thus, resistance thereof against a sudden change in a temperature is increased, and thus the object of the present invention is attained.

Further, according to the present invention, the surface of the sealing substrate made of glass is processed to have a concaved portion and a dry agent is disposed in the concave portion. Thus. as a conventional case, the dray agent can be provided in a sealed space surrounded by the element substrate, the sealing substrate, and the seal member to capture moisture which is transmitted through an adhesion member and penetrated in the sealed space. Calcium oxide, barium oxide, or the like can be suitably used for the dry agent. The dry agent may be provided on, for example, a driver circuit. Then, since the dry agent is present close to the light emitting element in a sealed region between the element substrate and the sealing substrate, penetration of moisture to the light emitting element can be reduced. Thus, stability of the light emitting element can be improved. For example, a dark spot caused by oxidation of a cathode can be reduced.

Also, according to the present invention, the sealing substrate made of glass is processed so that an outer edge portion of the sealing substrate protrudes in a convex shape. The gap between the element substrate and the sealing substrate is controlled by the convex portion. Then, since a layer having adhesion which is provided between the

relative to the first region is a second region 104. Further, a region which is concaved relative to the second region is a third region 105. In other words, when a surface of the second substrate opposing the organic light emitting element is taken as the front surface and it is viewed from the rear surface of the second substrate. the first region is protruded in a convex shape relative to the second region and the third region.

The dry agent 107 is provided in the third region 105. A granular material or a flat sheet material can be also used for the day agent. For filling the dry agent, it is preferable that the third region is recessed by 50 μm to 150 μm relative to the second region.

The permeable film having high moisture permeability and having water vapor permeability is composed of an adhesive layer 125, a porous layer 126, and a base member 127. In order to contain the dry agent in the third region, the permeable film is attached with the adhesive layer 125 contacting with a part of the second region. The permeable film composed of the adhesive layer, the porous layer. and the base member, has a thickness of 150 μm to 300 μm. Also, it is desirable that the first substrate is located at a distance 10 μm to 50 μm or more apart from the surface of the base member constituting the permeable film so that the permeable film is not in contact with the first substrate. Thus, it is desirable that the second region is recessed by 160 μm to 350 μm relative to the first region.

Both an ultraviolet light curable resin and a heat curable resin can be used as the layer 106 having adhesion for bonding the element substrate and the sealing substrate together. The amount of moisture entering into the sealed region is determined by the product of an area of the layer having adhesion which is exposed to outside air and moisture permeability. Thus, it is desirable that the thickness of the layer having adhesion is minimized to reduce the area exposed to outside air.

According to the present invention, since the outer edge portion (first region) of the second substrate is protruded in a convex shape, the gap between the first substrate and the second substrate can be determined by the height of the convex portion of the outer edge portion of the second substrate. The layer having adhesion is not required to have a function for controlling the gap and thus may be used only to facilitate bonding of the first

substrate and the second substrate. Thus, the layer having adhesion can be made as thin as possible insofar as its material permits.

Next, another example of the present invention is indicated. The present invention described below adopts a construction which takes into consideration not only the reduction of moisture which is transmitted and enters through the layer having adhesion but also the reduction of the amount of moisture left in a dry gas in the sealed region.

Fig. 8B is a cross sectional view of an organic light emitting element. When compared with Fig. 8A, a difference from Fig. 8 is that the gap between the first substrate and the second substrate is made smaller at 10 urn to 50 urn in the display region 129. The permeable film has a thickness of 150 μm to 300 μm and the gap having such a large thickness is unnecessary in the display region in which the permeable film is not provided. When the gap in the display region which takes up a predominantly large area of a display device is reduced to 3% to 50% as compared with that in Fig. 8A, a volume of a sealed space, that is, a volume of the dry gas is reduced, and the total amount of moisture left in the gas is reduced as a result.

Fig. 8C shows an example in which a flat sheet dry agent 107 is disposed in the third region 105 of the second substrate 102. Calcium oxide or the like is preferably used for the flat sheet dry agent.

In order to prevent mixing of fine powder into the display region which occurs when the dry agent is partially peeled off or otherwise damaged due to a shock applied thereon, adhesives 109 are provided in several locations on the surface of the dry agent and a porous film 108 having a thickness of 10 μm to 30 μm is attached to the dry agent through the adhesives 109. Thus, when the dry agent is covered with the porous film, fine powder produced due to a mechanical shock can be contained inside the porous film. It is preferable that the porous film are hollowed in a circular shape in two or more locations to expose the dry agent, an adhesive 110 is applied to the thus exposed portions, whereby the dry agent and the second substrate are bonded to each other. The thickness of the adhesive can be set to be 1 μm to 5 μm by controlling the amount of the adhesive to be applied onto the surface of the dry agent. In the case of Fig. 8C, it is desirable that a thickness of the porous film, a thickness of the dry agent. and a thickness of the adhesive

are adjusted so that the dry agent and the porous film can be received in the third region recessed by 50 μm to 150 μm relative to the second region.

In the cases of Figs. 8A and 8B in order not to crush the permeable film due to weight of the dry agent, it is required that the base member 127 having a thickness of 100 μm to 150 μm is provided in contact with the porous film 126 having a thickness of about 10 μm to 70 μm. Thus, the thickness of the base member and the thickness of the porous film needs to be increased to improve a mechanical strength of the permeable film. Further, since the adhesive layer 125 having a thickness of 40 μm to 80 μm is required for adhering the film to the substrate, the overall thickness of the permeable film becomes as large as 150 μm to 300 μm. Thus, the amount of moisture left in the gas in the sealed space is increased in correspondence with a volume occupied by the permeable film.

However, in the case of Fig. 8C, the film is only required to cover the dry agent and needs not to have high mechanical strength. Thus, even when a thin porous film having a thickness of 10 μm to 30 μm is used, there is no problem for practical use. Also, a volume of the sealed space can be reduced due to the reduced thickness of the film. To cover the dry agent, the porous films are provided on an upper surface (surface opposing the second substrate) of the dry agent and on a lower surface (surface opposing the first substrate) thereof. Thus, when the porous film having a thickness of 10 μm to 30 μm is used, the thickness of the porous film within the gap becomes twice as large, that is, 20 μm to 60 μm. Even so, the thickness of the porous film within the gap is made smaller than the thickness of permeable film. If the amount of dry agent is the same, a volume of the sealed region can be reduced with the construction shown in Fig. 8C, and thus the amount of moisture left in the gas becomes small. This leads to the suppression of oxidation reaction of the cathode due to moisture and the useful life of the display device can be increased.

Note that, in the case of Fig. 8C, it is preferable that the second region 104 is recessed by 10 μm to 50 μm relative to the first region so that the gap between the first substrate and the second substrate in the display region is set to be 10 μm to 50 μm.

Also, in the present invention, since the sealing substrate and the element substrate are translucent, light emitted from the organic light emitting element provided on the